

## WHAT IS CLAIMED IS:

1. A system for dynamically adjusting sectorization of a multiple sectored cell in a cell-based communication system comprising:

a signal monitor disposed in a signal path of said communication system for monitoring signal attributes of a signal transmitted to each of said multiple sectors;

5 a signal processor for processing said monitored signal attributes into a load metric for each of said multiple sectors; and

a sector forming unit for selectively adjusting sector dimensions of one or more of said multiple sectors responsive to a comparison of said load metric for each of said multiple sectors.

2. The system of claim 1 wherein said signal monitor comprises a code division multiple access (CDMA) decoder.

3. The system of claim 1 wherein said monitored signals comprise a pilot signal and wherein said signal attributes comprise:

a pilot channel power; and

a pilot-to-interference ratio.

4. The system of claim 3 wherein said signal attributes further comprise:

a paging channel power;

a synch channel power; and

a traffic channel power.

5. The system of claim 4 wherein said signal attributes further comprise thermal noise.

6. The system of claim 4 wherein said load metric comprises a relationship between said pilot channel power, said paging channel power, said synch channel power, and said pilot-to-interference ratio.

7. The system of claim 5 wherein said relationship is determined according to the formula:

$$P_{traffic} = \frac{P_{pilot}}{Ec/I_o} - (P_{pilot} + P_{paging} + P_{sync})$$

wherein  $Ec/I_o$  represents the pilot-to-interference ratio.

8. The system of claim 6 wherein said load metric is normalized to a preset maximum power rating for each of said multiple sectors.

9. The system of claim 8 wherein said normalization is calculated according to the formula:

$$L = \frac{P_{traffic}}{P_{Max}}$$

wherein L represents said normalized load metric.

10. The system of claim 1 wherein said sector forming unit comprises:  
a beam width controller; and  
an azimuth controller.

11. The system of claim 10 further comprising a signal power controller.

12. The system of claim 1 wherein said signal monitor is disposed in each of said transmission signal paths of said system corresponding to each of said multiple sectors.

13. The system of claim 12 wherein each sector's load metric is determined simultaneously.

14. The system of claim 1 further comprising:  
a switch in communication with said signal monitor and with each signal path of said multiple sectors, said switch for alternately switching signals disposed on each of said signal paths into said signal monitor.

15. The system of claim 14 wherein said signal monitor serially determines said load metric for each of said multiple sectors.

16. The system of claim 1 wherein said load metric comprises an average of measurements taken during a predetermined time period.

17. The system of claim 16 wherein said average is calculated according to the formula:

$$\hat{L}_i[n] = (1 - \alpha)L_i[n] + \alpha\hat{L}_i[n-1]$$

wherein  $\hat{L}_i[n]$  represents a current average value,  $\hat{L}_i[n-1]$  represents a previous average value, and  $\alpha$  represents a filter parameter.

$\hat{L}_i[n]$   
 $\hat{L}_i[n-1]$   
 $\alpha$   
 $L_i[n]$   
 $L_i[n-1]$   
 $\alpha$   
 $\hat{L}_i[n]$   
 $\hat{L}_i[n-1]$   
 $\alpha$   
 $L_i[n]$   
 $L_i[n-1]$   
 $\alpha$   
 $\hat{L}_i[n]$   
 $\hat{L}_i[n-1]$   
 $\alpha$   
 $L_i[n]$   
 $L_i[n-1]$   
 $\alpha$

18. A method for dynamically adjusting sectorization of a multiple sector cell in a cellular communication system comprising the steps of:

measuring signal properties along a sector transmission path for each of said multiple sectors of said multiple sector communication system;

5 calculating a load indicator for each of said multiple sectors using said measured signal properties;

comparing said calculated load indicators for each of said multiple sectors to determine comparative load between said multiple sectors; and

10 gradually adjusting the dimensions of said multiple sectors responsive to said determined comparative load.

19. The method of claim 18 wherein said measuring step comprises the steps of:

measuring a power of a pilot channel; and

measuring a pilot-to-interference ratio.

20. The method of claim 19 wherein said measuring step further comprises the steps of:

measuring a power of a paging channel; and

measuring a power of a synch channel.

21. The method of claim 20 wherein said calculating step comprises the step of solving for a power of a traffic channel using a relationship between said measured pilot channel power, said measured paging channel power, said measured synch channel power, and said measured pilot-to-interference ratio.

22. The method of claim 21 wherein said relationship comprises the formula:

$$P_{traffic} = \frac{P_{pilot}}{Ec/Io} - (P_{pilot} + P_{paging} + P_{sync})$$

wherein  $Ec/Io$  represents the pilot-to-interference ratio.

23. The method of claim 21 wherein said calculating step further comprises normalizing said solved traffic channel power to a predetermined maximum power rating for each of said multiple sectors.

24. The method of claim 23 wherein said normalization is calculated according to the formula:

$$L = \frac{P_{traffic}}{P_{Max}}$$

wherein  $L$  represents said normalized traffic channel power.

25. The method of claim 18 wherein said gradually adjusting step comprises the step of gradually adjusting one or more of a beam width and an azimuth angle.

26. The method of claim 25 wherein said gradually adjusting step further comprises the step of adjusting a transmission signal power.

27. The method of claim 18 wherein said calculating said load indicator step comprises the step of:

simultaneously calculating said load indicator for each of said multiple sectors.

28. The method of claim 18 wherein said measuring signal properties step further comprises the step of alternately switching between said signal transmission path of each of said multiple sectors; and

wherein said calculating said load indicator step comprises the step of:

serially calculating said load indicator for each of said multiple sectors.

29. The method of claim 18 wherein said calculated load indicator comprises an average of said signal properties measured during a predetermined time period.

30. The system of claim 29 wherein said average is calculated according to the formula:

$$\hat{L}[n] = (1 - \alpha)L[n] + \alpha\hat{L}[n - 1]$$

wherein  $\hat{L}[n]$  represents a current average value,  $\hat{L}[n - 1]$  represents a previous average value, and  $\alpha$  represents a filter parameter.

31. A method for dynamically redistributing sector traffic in a multiple sector, wireless communication cell comprising the steps of:

determining an amount of traffic for each of said multiple sectors in said cell;  
comparing said determined amounts of traffic for each of said multiple sectors;  
redistributing said sector traffic responsive to results of said comparing step.

32. The method of claim 31 wherein said determining step comprises the steps of:

measuring signal attributes of a pilot signal transmitted from a transceiver of said wireless communication cell; and  
calculating a traffic load indicator using said measured signal attributes.

33. The method of claim 31 wherein said comparing step comprises the steps of:  
determining a maximum loaded sector using said determined amounts of traffic;  
determining a minimum loaded sector using said determined amounts of traffic; and  
comparing a difference between said maximum and said minimum loaded sector with a predefined traffic differential limit.

34. The method of claim 31 wherein said redistributing step comprises the steps of:

receiving a signal indicating said difference between said maximum and said minimum loaded sector exceeds said predefined traffic differential limit;  
adjusting a coverage area of at least one sector in said multiple sectors.



35. The method of claim 34 wherein said adjusting said coverage area step comprises the step of:

adjusting a beam width and an azimuth of an antenna transmission from said cell.

36. The method of claim 35 further comprising the step of:

adjusting a power of said antenna transmission from said cell.

Year	Age	Sex	Height (cm)	Weight (kg)	Body Mass Index (kg/m <sup>2</sup> )	Waist Circumference (cm)	Hip Circumference (cm)	Waist-Hip Ratio
1990	20	M	170	65	22.6	85	95	0.89
1995	25	M	175	75	24.5	90	100	0.90
2000	30	M	180	85	26.4	95	105	0.90
2005	35	M	185	95	28.3	100	110	0.91
2010	40	M	190	105	30.2	105	115	0.91
2015	45	M	195	115	32.1	110	120	0.92
2020	50	M	200	125	34.0	115	125	0.92
2025	55	M	205	135	35.9	120	130	0.93
2030	60	M	210	145	37.8	125	135	0.93
2035	65	M	215	155	39.7	130	140	0.93
2040	70	M	220	165	41.6	135	145	0.93
2045	75	M	225	175	43.5	140	150	0.93
2050	80	M	230	185	45.4	145	155	0.93
2055	85	M	235	195	47.3	150	160	0.93
2060	90	M	240	205	49.2	155	165	0.93
2065	95	M	245	215	51.1	160	170	0.93
2070	100	M	250	225	53.0	165	175	0.93
2075	105	M	255	235	54.9	170	180	0.93
2080	110	M	260	245	56.8	175	185	0.93
2085	115	M	265	255	58.7	180	190	0.93
2090	120	M	270	265	60.6	185	195	0.93
2095	125	M	275	275	62.5	190	200	0.93
2100	130	M	280	285	64.4	195	205	0.93
2105	135	M	285	295	66.3	200	210	0.93
2110	140	M	290	305	68.2	205	215	0.93
2115	145	M	295	315	70.1	210	220	0.93
2120	150	M	300	325	72.0	215	225	0.93
2125	155	M	305	335	73.9	220	230	0.93
2130	160	M	310	345	75.8	225	235	0.93
2135	165	M	315	355	77.7	230	240	0.93
2140	170	M	320	365	79.6	235	245	0.93
2145	175	M	325	375	81.5	240	250	0.93
2150	180	M	330	385	83.4	245	255	0.93
2155	185	M	335	395	85.3	250	260	0.93
2160	190	M	340	405	87.2	255	265	0.93
2165	195	M	345	415	89.1	260	270	0.93
2170	200	M	350	425	91.0	265	275	0.93
2175	205	M	355	435	92.9	270	280	0.93
2180	210	M	360	445	94.8	275	285	0.93
2185	215	M	365	455	96.7	280	290	0.93
2190	220	M	370	465	98.6	285	295	0.93
2195	225	M	375	475	100.5	290	300	0.93
2200	230	M	380	485	102.4	295	305	0.93
2205	235	M	385	495	104.3	300	310	0.93
2210	240	M	390	505	106.2	305	315	0.93
2215	245	M	395					

37. A system for dynamically adjusting sectorization of a multiple sector cell in a cell-based communication system comprising:

a signal monitor disposed in a signal path of said communication system for monitoring signal attributes of signals received in association with each of said multiple sectors;

a signal processor for processing said monitored signal attributes into a load metric for each of said multiple sectors; and

a sector forming unit for selectively adjusting sector dimensions of one or more of said multiple sectors responsive to a comparison of said load metric for each of said multiple sectors.

38. The system of claim 37 wherein said signal monitor comprises a scan receiver.

39. The system of claim 38 wherein said signal attributes comprise a receive signal strength indicator.

40. The system of claim 39 wherein said multiple sectors are formed using multiple narrow antenna beams, and wherein said monitored signal attributes of signals received in association with each said multiple sectors include a receive signal strength indicator for each narrow antenna beam associated with each particular sector of said multiple sectors.

41. The system of claim 37 wherein said sector forming unit comprises:  
a beam width controller; and  
an azimuth controller.

42. The system of claim 41 further comprising a signal power controller.

43. The system of claim 37 wherein said signal monitor is disposed in each receive signal paths of said system corresponding to each of said multiple sectors.

44. The system of claim 43 wherein each sector's load metric is determined simultaneously.

45. The system of claim 37 further comprising:  
a switch in communication with said signal monitor and with each signal path of said multiple sectors, said switch for alternately switching signals disposed on each of said signal paths into said signal monitor.

46. The system of claim 45 wherein said signal monitor serially determines said load metric for each of said multiple sectors.

47. The system of claim 37 wherein said load metric comprises an average of measurements taken during a predetermined time period.